



PROCEEDINGS OF THE INTEGRATED OCEAN DRILLING PROGRAM

VOLUME 340 EXPEDITION REPORTS LESSER ANTILLES VOLCANISM AND LANDSLIDES

Expedition 340 of the riserless drilling platform
San Juan, Puerto Rico, to Curaçao, Dutch Antilles
Sites U1393–U1401
2 March–17 April 2012

Volume authorship

Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340
Scientists

Published by
Integrated Ocean Drilling Program Management International, Inc.,
for the Integrated Ocean Drilling Program

Prepared by
U.S. Implementing Organization Science Services, Texas A&M University

Publisher's notes

Funding for the program was provided by the following agencies at the time of this expedition:

National Science Foundation (NSF), United States

Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan

European Consortium for Ocean Research Drilling (ECORD)

Ministry of Science and Technology (MOST), People's Republic of China

Korea Institute of Geoscience and Mineral Resources (KIGAM)

Australian Research Council (ARC) and GNS Science (New Zealand), Australian/New Zealand Consortium

Ministry of Earth Sciences (MoES) India

Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the participating agencies, IODP Management International, Inc., Consortium for Ocean Leadership, Lamont-Doherty Earth Observatory of Columbia University, Texas A&M University, or Texas A&M Research Foundation.

Examples of how to cite this volume or part of this volume are available at publications.iodp.org/proceedings/340/340bib.htm.

Abbreviations for names of organizations and publications in IODP reference lists follow the style given in *Chemical Abstracts Service Source Index* (published by American Chemical Society).

The bulk of the shipboard-collected core data from this expedition is accessible from Integrated Ocean Drilling Program U.S. Implementing Organization (IODP-USIO) Science Services, Texas A&M University (TAMU), at iodp.tamu.edu/database/index.html. If you cannot access this site or need additional data, please contact:

Data Librarian, Integrated Ocean Drilling Program, Texas A&M University, 1000 Discovery Drive, College Station TX 77845-9547, USA. Tel: (979) 845-8495; Fax: (979) 458-1617; E-mail: database@iodp.tamu.edu

A complete set of the logging data collected by IODP-USIO Science Services, Lamont-Doherty Earth Observatory (LDEO), is available at brg.ldeo.columbia.edu/logdb/. If you have problems downloading the data, wish to receive additional logging data, or have questions regarding the data, please contact:

Database Administrator, Borehole Research Group, Lamont-Doherty Earth Observatory of Columbia University, PO Box 1000, 61 Route 9W, Palisades NY 10964, USA. Tel: (845) 365-8343; Fax: (845) 365-3182; E-mail: logdb@ldeo.columbia.edu

Supplemental data were provided by the authors and may not conform to IODP publication formats.

Some core photographs have been tonally enhanced to better illustrate particular features of interest. High-resolution images are available upon request.

Cover photograph shows view of Soufrière Hills Volcano (Montserrat) through the derrick of the *JOIDES Resolution*. Photo credit: Anne Le Friant.

ISSN

DVD: 1930-1022; World Wide Web: 1930-1014

Foreword

By Integrated Ocean Drilling Program Management International, Inc.

The Integrated Ocean Drilling Program (IODP) is now in the latter half of its decadal program (2003–2013). As envisioned in the Initial Science Plan (ISP), IODP expeditions take advantage of three scientific ocean drilling platforms that enable us to cover unprecedented areas of wide oceans, from ice-covered shallow water to full ocean depths. Drilling miles of depth below seafloor, now part of IODP capabilities, is the major advance from the program predecessors, the Deep Sea Drilling Project and the Ocean Drilling Program. The living Earth is a dynamic system that is continuously evolving. IODP seeks to understand this complex and unique system through scientific ocean drilling, sampling, and experimenting in deep holes, along with advancement of related scientific disciplines. IODP is an international collaboration among scientists and nations with keen aspirations to attain the scientific goals of the ISP. IODP currently includes participating members from 26 nations.

The *Proceedings* present the scientific and engineering results of IODP drilling projects, each designed to better understand the past, present, and future of the Earth system.

IODP expeditions begin with scientists who submit research drilling proposals to test new and innovative ideas, then the proposals progress to international scientific advisors (Science Advisory Structure) who nurture, evaluate, rank, and prioritize proposals. Scientists also schedule the science operations, select science party members from scores of international scientists qualified to participate, plan platform operations, ready the drillship, and choose borehole locations. The science party, collectively and individually, conducts science on board and on shore. The co-chief scientists on each expedition are responsible for synthesizing the scientific results as hallmark of expedition.

Ocean-drilling achievements help us to understand and interpret phenomena in various parts of the Earth system. Achievements in the two legacy drilling programs have validated the scientific concepts behind plate tectonics, contributed to the understanding of ocean circulation changes, and extended our knowledge of long- and short-term climate change. IODP is truly an expansion and extension of the scientific research conducted by the legacy programs, engaging in cutting-edge research concerning topics of global importance.

IODP drilling platform operations are conducted by three Implementing Organizations (IOs). Riserless platform operations are conducted by the U.S. Implementing Organization (USIO), comprising the Consortium for Ocean Leadership, Inc., Texas A&M University through the Texas A&M Research Foundation, and Lamont-Doherty Earth Observatory of Columbia University. Riser platform operations are conducted by the Japan Agency for Marine-Earth Science and Technology through Japan's Center for Deep Earth Exploration in cooperation with the Center for Advanced Marine Core Research at Kochi University. Mission-specific platform operations are conducted by the European Consortium for Ocean Research Drilling (ECORD) Science Operator (ESO), comprising the British Geological Survey, the University of Bremen, and the European Petrophysics Consortium. The European IO currently represents the ocean-drilling efforts of 16 nations in Europe, plus Canada.

The discoveries presented in this volume build upon layers of knowledge and science developed over roughly the last fifty years. Expedition *Proceedings* are published by IODP Management International for IODP under the sponsorship of the U.S. National Science Foundation (NSF), Japan's Ministry of Education, Culture, Sports, Science and Technology, and other IODP members. The material is based upon research supported under Contract OCE-0432224 from NSF.

Kiyoshi Suyehiro
President & Chief Executive Officer
Integrated Ocean Drilling Program Management International, Inc.
Tokyo
www.iodp.org/



Integrated Ocean Drilling Program

Integrated Ocean Drilling Program Management International, Inc.

Web site: www.iodp.org/

IODP-MI

1001 Connecticut Avenue, NW, Suite 504
Washington DC 20036
USA
Tel: (202) 465-7500; Fax: (202) 955-8363
E-mail: info@iodp.org

IODP-MI

Tokyo University of Marine Science and
Technology
Office of Liaison and Cooperative Research,
3rd Floor
2-1-6, Etchujima, Koto-ku, Tokyo 135-8533
Japan
Tel: (81) 3-6701-8-3181; Fax: (81) 3-6701-3189

IODP-MI member organizations*

Alfred-Wegener-Institute für Polar und
Meeresforschung, Germany

British Geological Survey, United Kingdom

Cardiff University, United Kingdom

Columbia University, Lamont-Doherty Earth
Observatory, USA

Federal Institute of Technology (ETH) Zurich,
Switzerland

Florida State University, USA

Hokkaido University, Japan

Helmholtz Centre for Ocean Research Kiel
(GEOMAR), Germany

Institut de Physique du Globe de Paris, France

Institut Universitaire Européen de la Mer (IUEM),
France

Japan Agency for Marine-Earth Science and
Technology (JAMSTEC), Japan

Kochi University, Japan

Kyushu University, Japan

National Institute of Advanced Industrial Science
(AIST), Japan

Rutgers University, USA

Texas A&M University, USA

Tohoku University, Japan

Tongji University, People's Republic of China

Universität Bremen, Germany

University of Bergen, Norway

University of California at San Diego, Scripps
Institution of Oceanography, USA

University of California at Santa Cruz, USA

University of Hawaii, USA

University of Leicester, United Kingdom

University of Miami, USA

University of Southampton, National Oceanography
Centre, United Kingdom

University of Tasmania/IMS, Australia

University of Texas at Austin, USA

University of Tokyo, Japan

University of Washington, USA

Woods Hole Oceanographic Institution, USA

*At time of expedition.



Implementing organizations

IODP European Implementing Organization: European Consortium for Ocean Research Drilling, Science Operator (ESO)

Web site: www.eso.ecord.org/

IODP-ESO Coordinator: Science, Logistics, and Operations

British Geological Survey
Murchinson House
West Mains Road
Edinburgh EH9 3LA
United Kingdom
Tel: (44) 131-667-1000; Fax: (44) 131-668-4140
E-mail: eso@bgs.ac.uk

IODP-ESO Curation and Laboratories

IODP Bremen Core Repository (BCR)
Center for Marine Environmental Sciences (MARUM)
University of Bremen
Leobener Strasse
28359 Bremen
Germany
Tel: (49) 421-218-65560; Fax: (49) 421-218-98-65560
E-mail: bcr@marum.de

IODP-ESO Petrophysics

European Petrophysics Consortium
Department of Geology
University of Leicester
Leicester LE1 7RH
United Kingdom
Tel: (44) 116-252-3611; Fax: (44) 116-252-3918
E-mail: sjd27@leicester.ac.uk

IODP Japanese Implementing Organization: Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Web site: www.jamstec.go.jp/chikyuu/eng/index.html

IODP-Japan Science Operator

Center for Deep Earth Exploration (CDEX)
Japan Agency for Marine-Earth Science and
Technology
Yokohama Institute for Earth Sciences
3175-25 Showa-machi
Kanazawa-ku, Yokohama
Kanagawa 236-0001
Japan
Tel: (81) 45-778-5643; Fax: (81) 45-778-5704
E-mail: cdex@jamstec.go.jp



IODP U.S. Implementing Organization

Web site: www.iodp-usio.org/

IODP-USIO Systems Integration Contractor

Consortium for Ocean Leadership
1201 New York Avenue, NW, 4th floor
Washington DC 20005
USA
Tel: (202) 232-3900; Fax: (202) 462-8754
E-mail: info@oceanleadership.org

IODP-USIO Science Services, LDEO

Lamont-Doherty Earth Observatory
of Columbia University
PO Box 1000, 61 Route 9W
Palisades NY 10964
USA
Tel: (845) 365-8672; Fax: (845) 365-3182
E-mail: borehole@ldeo.columbia.edu

IODP-USIO Science Services, TAMU

Integrated Ocean Drilling Program
Texas A&M University
1000 Discovery Drive
College Station TX 77845-9547
USA
Tel: (979) 845-2673; Fax: (979) 845-4857
E-mail: information@iodp.tamu.edu



Expedition 340 science party*

Expedition 340 scientists

Anne Le Friant

Co-Chief Scientist

Équipe de Géologie des Systèmes Volcaniques
Institut de Physique du Globe de Paris
Sorbonne Paris Cité, UMR 7154 CNRS
1 Rue Jussieu
75238 Paris Cedex 05
France
lefriant@ipgp.fr

Osamu Ishizuka

Co-Chief Scientist

Geological Survey of Japan (AIST)
Central 7
1-1-1 Higashi
Tsukuba
Ibaraki 305-8567
Japan
o-ishizuka@aist.go.jp

Nicole A. Stroncik

Expedition Project Manager/Staff Scientist

Integrated Ocean Drilling Program
Texas A&M University
1000 Discovery Drive
College Station TX 77845-9547
USA
stroncik@iodp.tamu.edu

Angela L. Slagle

Logging Staff Scientist

Borehole Research Group
Lamont-Doherty Earth Observatory
of Columbia University
PO Box 1000, 61 Route 9W
Palisades NY 10964
USA
aslagle@ldeo.columbia.edu

Sally Morgan

Logging Staff Scientist

Borehole Research Group
Department of Geology
University of Leicester
University Road
Leicester LE1 7RH
United Kingdom
sm509@leicester.ac.uk

Tatsuya Adachi

Physical Properties/Downhole

Measurements Specialist

Department of Earth and Environmental Science
Yamagata University
1-1-18 Yakushi-machi
Yamagata 990-0053
Japan
s11e501m@st.yamagata-u.ac.jp

Mohammed Aljahdali

Micropaleontologist (nannofossils)

Department of Earth, Ocean and Atmospheric
Sciences
Florida State University
108 Carraway Building
Tallahassee FL 32306-0001
USA
ma10u@my.fsu.edu

Georges Boudon

Structural Geologist

Équipe de Géologie des Systèmes Volcaniques
Institut de Physique du Globe de Paris
Sorbonne Paris Cité, UMR 7154 CNRS
1 Rue Jussieu
75238 Paris Cedex 05
France
boudon@ipgp.fr

Christoph Breitzkreuz

Physical Properties/Downhole

Measurements Specialist

Physical Volcanology and Sedimentology
Institut für Geologie und Paläontologie
Technische Universität Bergakademie Freiberg
Bernhard-von-Cotta Strasse 2
09599 Freiberg
Germany
cbreit@geo.tu-freiberg.de

Daisuke Endo

Sedimentologist/Volcanologist

A203, Earth Evolution Sciences
University of Tsukuba
1-1-1 Tennodai
Tsukuba
Ibaraki 305-8572
Japan
endora@geol.tsukuba.ac.jp

*Addresses at time of expedition, except where updated by the participants.



Andrew J. Fraass
Micropaleontologist (foraminifers)

Department of Geosciences
University of Massachusetts
611 North Pleasant Street
Amherst MA 01003
USA

afraass@geo.umass.edu

Akihiko Fujinawa
Sedimentologist/Volcanologist

Department of Earth Sciences
Ibaraki University
2-1-1 Bunkyo
Mito
Ibaraki 310-8512
Japan

fujinawa@mx.ibaraki.ac.jp

Robert G. Hatfield
Paleomagnetist

College of Oceanic and Atmospheric Sciences
Oregon State University
104 COAS Administration Building
Corvallis OR 97331-5503
USA

rhatfield@coas.oregonstate.edu

Matthew J. Hornbach
**Physical Properties/Downhole
Measurements Specialist**

Southern Methodist University
Huffington Department of Earth Sciences
PO Box 750395
Dallas Texas 75275-0395
USA

matt.hornbach@gmail.com

Martin Jutzeler
Physical Properties Specialist

Geology Department
University of Otago
PO Box 56
Dunedin 9054
New Zealand

jutzeler@gmail.com

Kyoko S. Kataoka
Sedimentologist/Volcanologist

Research Institute for Natural Hazards and
Disaster Recovery
Niigata University
2-cho 8050 Ikarashi
Nishi-ku
Niigata 950-2181
Japan

kataoka@gs.niigata-u.ac.jp

Sara Lafuerza
**Physical Properties/Downhole
Measurements Specialist**

Équipe de Géologie des Systèmes Volcaniques
Institut de Physique du Globe de Paris
Sorbonne Paris Cité, UMR 7154 CNRS
1 Rue Jussieu

75238 Paris Cedex 05

France

sara.lafuerza@gmail.com

Fukashi Maeno
Sedimentologist/Volcanologist

Earthquake Research Institute
University of Tokyo
1-1-1 Yayoi
Bunkyo-ku
Tokyo 113-0032

Japan

fmaeno@eri.u-tokyo.ac.jp

Michael Manga
**Physical Properties/Downhole
Measurements Specialist**

Department of Earth and Planetary Science
University of California, Berkeley
307 McCone Hall
Berkeley CA 94720

USA

manga@seismo.berkeley.edu

Michael Martinez-Colon
Micropaleontologist (foraminifers)

College of Marine Science
University of South Florida, St. Petersburg
140 7th Avenue South
St. Petersburg FL 33701

USA

mmartin8@mail.usf.edu

Molly C. McCanta
Sedimentologist/Volcanologist

Department of Geology
Tufts University
2 North Hill Road
Lane Hall
Medford MA 02155

USA

mccanta@tufts.edu

James McManus
Inorganic Geochemist

College of Earth, Ocean, and Atmospheric
Sciences

Oregon State University
104 CEOAS Administration Building
Corvallis OR 97331-5503

USA

mcmanus@coas.oregonstate.edu



Martin R. Palmer
Inorganic Geochemist
School of Ocean and Earth Science
National Oceanography Centre
University of Southampton
European Way
Southampton SO14 3ZH
United Kingdom
pmrp@noc.soton.ac.uk

Takeshi Saito
Paleomagnetist
International Young Researchers
Empowerment Center
Shinshu University
3-1-1 Asahi
Matsumoto 390-8621
Japan
saito@shinshu-u.ac.jp

Adam Stinton
Sedimentologist/Observer
Montserrat Volcano Observatory
PO Box 318
Flemmings
Montserrat
West Indies
adam@mvo.ms

Konduri S.V. Subramanyam
Inorganic Geochemist
Geochemistry Division
National Geophysical Research Institute (NGRI)
Uppal Road
Hyderabad 500 007
India
konduri2003@yahoo.com

Peter J. Talling
Sedimentologist/Volcanologist
School of Ocean and Earth Science
National Oceanography Centre
University of Southampton
European Way
Southampton SO14 3ZH
United Kingdom
peter.talling@noc.soton.ac.uk

Yoshihiko Tamura (Tabata)
Sedimentologist/Volcanologist
Institute for Research on Earth Evolution (IFREE)
Japan Agency for Marine-Earth Science and
Technology
2-15 Natsushima-cho
Yokosuka 237-0061
Japan
tamuray@jamstec.go.jp

Benoît Villemant
Inorganic Geochemist
Université P&M Curie
UPMC-CNRS UMR 7193 IsTeP
T46-00 E3, Case Courier 109
4 Place Jussieu
75005 Paris
France
benoit.villemant@upmc.fr

Deborah Wall-Palmer
Micropaleontologist (foraminifers)
School of Earth, Ocean and Environmental Sciences
Fitzroy Building, Room 118
Plymouth University
Drake Circus
Plymouth PL4 8AA
United Kingdom
deborah.wall-palmer@plymouth.ac.uk

Fei Wang
Sedimentologist/Volcanologist
Institut of Geology and Geophysics
Chinese Academy of Sciences
19 Bei-Tu-Cheng-Xi Road
Chao Yang District
100029, Beijing
People's Republic of China
wangfei@mail.iggcas.ac.cn

Education and outreach

Teresa M. Greely

Education Officer

College of Marine Science
University of South Florida, St. Petersburg
140 Seventh Avenue South
St. Petersburg FL 33701
USA
greely@usf.edu

Operational and technical staff

Siem Offshore AS officials

Terry Skinner

Master of the Drilling Vessel

James Samuel McLelland

Offshore Installation Manager

Curt Wayne Lambert

Offshore Installation Manager

IODP-USIO shipboard personnel and technical representatives

Heather Barnes

X-Ray Laboratory

Gemma Barrett

Curatorial Specialist

Michael Bertoli

Chemistry Laboratory

Timothy Blaisdell

Applications Developer

Lisa Brandt

Core Laboratory

Etienne Claassen

Marine Instrumentation Specialist

David Fackler

Applications Developer

Emily Fisher

Marine Laboratory Specialist (Temporary)

Thomas Gorgas

Physical Properties Laboratory

Ted Gustafson

Thin Section Laboratory

Margaret Hastedt

Paleomagnetism Laboratory

Sandra Herrmann

Core Laboratory

Michael Hodge

Marine Computer Specialist

Rhonda Kappler

Publications Specialist

Jan Jurie Kotze

Marine Instrumentation Specialist

Stephen Midgley

Operations Superintendent

Carrie Miller

Marine Laboratory Specialist (Temporary)

William Mills

Laboratory Officer

Erik Moortgat

Chemistry Laboratory

Chieh Peng

Assistant Laboratory Officer

Steve Prinz

Assistant Laboratory Officer

Kerry Swain

Logging Engineer

Andrew Trefethen

Marine Computer Specialist



IODP-USIO Publication Services staff*

Lyndal Arceneaux
Student Assistant

Gudelia (“Gigi”) Delgado
Senior Publications Coordinator

Patrick H. Edwards
Production Specialist IV

Tim Fulton
Graphics Specialist II

Jaime A. Gracia
Supervisor of Production

Jenni Hesse
Editor III

Rhonda Kappler
Graphics Specialist III

Shana C. Lewis
Editor III

Ginny Lowe
Reports Coordinator

Amy McWilliams
Editor III

Angeline T. Miller
Manager of Publication Services

Deborah L. Partain
Supervisor of Graphics

Lorri Peters
Supervisor of Editing

Kenneth Sherar
Production Specialist III

Alyssa Stephens
Graphics Specialist II

Crystal Wolfe
Production Specialist III

Jean Wulfson
Graphics Specialist II

Ann Yeager
Distribution Specialist

*At time of publication.



Contents

Expedition reports

Chapters

[Expedition 340 summary](#)
Expedition 340 Scientists

[Methods](#)
Expedition 340 Scientists

[Site U1393](#)
Expedition 340 Scientists

[Site U1394](#)
Expedition 340 Scientists

[Site U1395](#)
Expedition 340 Scientists

[Site U1396](#)
Expedition 340 Scientists

[Site U1397](#)
Expedition 340 Scientists

[Site U1398](#)
Expedition 340 Scientists

[Site U1399](#)
Expedition 340 Scientists

[Site U1400](#)
Expedition 340 Scientists

[Site U1401](#)
Expedition 340 Scientists

Core descriptions

Visual core descriptions (VCDs), thin section data, and core images are included in this section. VCDs and thin sections are combined into PDF files for each site. The entire set of core images in PDF is available in the IMAGES directory.

Site U1393

[Visual core descriptions](#) · [Thin sections](#)

Site U1394

[Visual core descriptions](#)

[Hole U1394A cores](#) · [Hole U1394B cores](#) · [Thin sections](#)

Site U1395

[Visual core descriptions](#)

[Hole U1395A cores](#) · [Hole U1395B cores](#) · [Hole U1395A thin sections](#) · [Hole U1395B thin sections](#)



Site U1396

Visual core descriptions

[Hole U1396A cores](#) · [Hole U1396B cores](#) · [Hole U1396C cores](#) · [Hole U1396A thin sections](#)

Site U1397

Visual core descriptions

[Hole U1397A cores](#) · [Hole U1397B cores](#) · [Hole U1397A thin sections](#) · [Hole U1397B thin sections](#)

Site U1398

Visual core descriptions

[Hole U1398A cores](#) · [Hole U1398B cores](#)

Site U1399

Visual core descriptions

[Hole U1399A cores](#) · [Hole U1399B cores](#)

Site U1400

Visual core descriptions

[Hole U1400A cores](#) · [Hole U1400B cores](#) · [Sections U1400C-2H-1 through U1400C-20H-CC](#) · [Sections U1400C-21H-1 through U1400C-49X-CC](#)

Site U1401

[Visual core descriptions](#)

Expedition research results

Data reports

Titles are available in [HTML](#).

Syntheses

Titles are available in [HTML](#).

Drilling location maps

A site map showing the drilling locations for this expedition and maps showing the drilling locations of all Integrated Ocean Drilling Program (IODP), Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP) drilling sites are available in PDF format. These maps were produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.F. Smith (gmt.soest.hawaii.edu/).

[IODP Expedition 340 site map](#)

[IODP map](#) (Expeditions 301–336 and 339–340)

[ODP map](#) (Legs 100–210)

[DSDP map](#) (Legs 1–96)

Expedition-related bibliography*

IODP publications

Scientific Prospectus

Le Friant, A., Ishizuka, O., and Stroncik, N., 2011. Lesser Antilles volcanism and landslides: drilling volcanic landslides deposits and volcanoclastic sediments in the Lesser Antilles arc: implications for hazard assessment and long-term magmatic evolution of the arc. *IODP Sci. Prosp.*, 340. [doi:10.2204/iodp.sp.340.2011](https://doi.org/10.2204/iodp.sp.340.2011)

Preliminary Report

Expedition 340 Scientists, 2012. Lesser Antilles volcanism and landslides: implications for hazard assessment and long-term magmatic evolution of the arc. *IODP Prel. Rept.*, 340. [doi:10.2204/iodp.pr.340.2012](https://doi.org/10.2204/iodp.pr.340.2012)

Proceedings volume

Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.2013](https://doi.org/10.2204/iodp.proc.340.2013)

Expedition 340 Scientists, 2013. Expedition 340 summary. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.101.2013](https://doi.org/10.2204/iodp.proc.340.101.2013)

Expedition 340 Scientists, 2013. Methods. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.102.2013](https://doi.org/10.2204/iodp.proc.340.102.2013)

Expedition 340 Scientists, 2013. Site U1393. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.103.2013](https://doi.org/10.2204/iodp.proc.340.103.2013)

Expedition 340 Scientists, 2013. Site U1394. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.104.2013](https://doi.org/10.2204/iodp.proc.340.104.2013)

Expedition 340 Scientists, 2013. Site U1395. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.105.2013](https://doi.org/10.2204/iodp.proc.340.105.2013)

Expedition 340 Scientists, 2013. Site U1396. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.106.2013](https://doi.org/10.2204/iodp.proc.340.106.2013)

Expedition 340 Scientists, 2013. Site U1397. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.107.2013](https://doi.org/10.2204/iodp.proc.340.107.2013)

Expedition 340 Scientists, 2013. Site U1398. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.108.2013](https://doi.org/10.2204/iodp.proc.340.108.2013)

Expedition 340 Scientists, 2013. Site U1399. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.109.2013](https://doi.org/10.2204/iodp.proc.340.109.2013)

Expedition 340 Scientists, 2013. Site U1400. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.110.2013](https://doi.org/10.2204/iodp.proc.340.110.2013)

*The [Expedition-related bibliography](#) is continually updated online. Please send updates to PubCrd@iodp.tamu.edu.



Expedition 340 Scientists, 2013. Site U1401. *In* Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.).
[doi:10.2204/iodp.proc.340.111.2013](https://doi.org/10.2204/iodp.proc.340.111.2013)



Directory structure*

340.PDF (Preliminary pages and table of contents)																				
README.TXT (ASCII information about the Expedition Reports ISO disc image)																				
EXP_REPT (Expedition Reports section of <i>Proc. IODP, 340</i>)	CHAPTERS (Expedition Reports chapters)																			
	<table border="1"> <tr><td>340_101.PDF (Expedition 340 summary)</td></tr> <tr><td>340_102.PDF (Methods)</td></tr> <tr><td>340_103.PDF (Site U1393)</td></tr> <tr><td>340_104.PDF (Site U1394)</td></tr> <tr><td>340_105.PDF (Site U1395)</td></tr> <tr><td>340_106.PDF (Site U1396)</td></tr> <tr><td>340_107.PDF (Site U1397)</td></tr> <tr><td>340_108.PDF (Site U1398)</td></tr> <tr><td>340_109.PDF (Site U1399)</td></tr> <tr><td>340_110.PDF (Site U1400)</td></tr> <tr><td>340_111.PDF (Site U1401)</td></tr> </table>	340_101.PDF (Expedition 340 summary)	340_102.PDF (Methods)	340_103.PDF (Site U1393)	340_104.PDF (Site U1394)	340_105.PDF (Site U1395)	340_106.PDF (Site U1396)	340_107.PDF (Site U1397)	340_108.PDF (Site U1398)	340_109.PDF (Site U1399)	340_110.PDF (Site U1400)	340_111.PDF (Site U1401)								
340_101.PDF (Expedition 340 summary)																				
340_102.PDF (Methods)																				
340_103.PDF (Site U1393)																				
340_104.PDF (Site U1394)																				
340_105.PDF (Site U1395)																				
340_106.PDF (Site U1396)																				
340_107.PDF (Site U1397)																				
340_108.PDF (Site U1398)																				
340_109.PDF (Site U1399)																				
340_110.PDF (Site U1400)																				
340_111.PDF (Site U1401)																				
	CORES (Visual core descriptions, thin section data, and core images)																			
	<table border="1"> <tr><td>CORU1393.PDF (Site U1393)</td></tr> <tr><td>CORU1394_1.PDF (Hole U1394 VCDs and Site U1394 thin sections)</td></tr> <tr><td>CORU1394_2.PDF (Hole U1394B VCDs)</td></tr> <tr><td>CORU1395_1.PDF (Hole U1395A VCDs and thin sections)</td></tr> <tr><td>CORU1395_2.PDF (Hole U1395B VCDs and thin sections)</td></tr> <tr><td>CORU1396_1.PDF (Hole U1396A VCDs and thin sections)</td></tr> <tr><td>CORU1396_2.PDF (Hole U1396B)</td></tr> <tr><td>CORU1396_3.PDF (Hole U1396C)</td></tr> <tr><td>CORU1397_1.PDF (Hole U1397A VCDs and thin sections)</td></tr> <tr><td>CORU1397_2.PDF (Hole U1397B VCDs and thin sections)</td></tr> <tr><td>CORU1398_1.PDF (Hole U1398A)</td></tr> <tr><td>CORU1398_2.PDF (Hole U1398B)</td></tr> <tr><td>CORU1399_1.PDF (Hole U1399A)</td></tr> <tr><td>CORU1399_2.PDF (Hole U1399B)</td></tr> <tr><td>CORU1400_1.PDF (Hole U1400A)</td></tr> <tr><td>CORU1400_2.PDF (Hole U1400B)</td></tr> <tr><td>CORU1400_3.PDF (Hole U1400C Sections 2H-1 through 20H-CC)</td></tr> <tr><td>CORU1400_4.PDF (Hole U1400C Sections 21H-1 through 49X-CC)</td></tr> <tr><td>CORU1401.PDF (Site U1401)</td></tr> <tr><td>IMAGES (PDF files of core images)</td></tr> </table>	CORU1393.PDF (Site U1393)	CORU1394_1.PDF (Hole U1394 VCDs and Site U1394 thin sections)	CORU1394_2.PDF (Hole U1394B VCDs)	CORU1395_1.PDF (Hole U1395A VCDs and thin sections)	CORU1395_2.PDF (Hole U1395B VCDs and thin sections)	CORU1396_1.PDF (Hole U1396A VCDs and thin sections)	CORU1396_2.PDF (Hole U1396B)	CORU1396_3.PDF (Hole U1396C)	CORU1397_1.PDF (Hole U1397A VCDs and thin sections)	CORU1397_2.PDF (Hole U1397B VCDs and thin sections)	CORU1398_1.PDF (Hole U1398A)	CORU1398_2.PDF (Hole U1398B)	CORU1399_1.PDF (Hole U1399A)	CORU1399_2.PDF (Hole U1399B)	CORU1400_1.PDF (Hole U1400A)	CORU1400_2.PDF (Hole U1400B)	CORU1400_3.PDF (Hole U1400C Sections 2H-1 through 20H-CC)	CORU1400_4.PDF (Hole U1400C Sections 21H-1 through 49X-CC)	CORU1401.PDF (Site U1401)
CORU1393.PDF (Site U1393)																				
CORU1394_1.PDF (Hole U1394 VCDs and Site U1394 thin sections)																				
CORU1394_2.PDF (Hole U1394B VCDs)																				
CORU1395_1.PDF (Hole U1395A VCDs and thin sections)																				
CORU1395_2.PDF (Hole U1395B VCDs and thin sections)																				
CORU1396_1.PDF (Hole U1396A VCDs and thin sections)																				
CORU1396_2.PDF (Hole U1396B)																				
CORU1396_3.PDF (Hole U1396C)																				
CORU1397_1.PDF (Hole U1397A VCDs and thin sections)																				
CORU1397_2.PDF (Hole U1397B VCDs and thin sections)																				
CORU1398_1.PDF (Hole U1398A)																				
CORU1398_2.PDF (Hole U1398B)																				
CORU1399_1.PDF (Hole U1399A)																				
CORU1399_2.PDF (Hole U1399B)																				
CORU1400_1.PDF (Hole U1400A)																				
CORU1400_2.PDF (Hole U1400B)																				
CORU1400_3.PDF (Hole U1400C Sections 2H-1 through 20H-CC)																				
CORU1400_4.PDF (Hole U1400C Sections 21H-1 through 49X-CC)																				
CORU1401.PDF (Site U1401)																				
IMAGES (PDF files of core images)																				
MAPS (Drilling location maps)	340_MAP.PDF (Expedition 340 site map)																			
	IODPMAP.PDF (IODP map, Expeditions 301–336 and 339–340)																			
	ODPMAP.PDF (ODP map, Legs 100–210)																			
	DSDPMAP.PDF (DSDP map, Legs 1–96)																			

*Directory structure reflects the Expedition Reports content and volume material produced on the ISO disc image.

